

islands, our oyster, lobster, and shell-fish fisheries, but also matters concerning the pearl fisheries of India, the sponge-fisheries of the Bahamas, and the possible coral fisheries of the Australian coast. Further, the duties which even among the self-helping inhabitants of the United States are assigned to a State entomologist, might here also be discharged. From the duly established officials of such a state zoological laboratory or institute, the Foreign Office and the Colonial Office could at once obtain full and decisive information enabling them to act intelligently in relation to the importation of the *Phylloxera* pest, whilst the Home Office might gain courage in the presence of the Colorado beetle. It seems strange that the creation of an official laboratory of economic zoology has been so long delayed.

We shall be able to judge in the case of the present exhibition whether the cooperation of scientific men would have rendered the English department more instructive than it is under the present conditions, as compared with the scientifically organised exhibits of foreign countries. The comparison of the official catalogue of the London Exhibition with that of the Berlin Exhibition will be important in the same direction. With regard to the essays for which the committee has offered prizes, it may at once be stated that unfortunately no steps have been taken to bring the questions concerning which treatises are desired under the notice of the persons most likely to be able to deal with them satisfactorily either in this country or abroad. A series of valuable reports might have been obtained and circulated in connection with the exhibition by a sufficiently public appeal to the zoological world made in due time. It may yet be not too late to take some steps in this matter.

#### SCIENCE AND ART

NO one will be surprised that Mr. Huxley took advantage of the opportunity afforded him at the Academy dinner to reply to some remarks made by Mr. Matthew Arnold on a like occasion two years ago. Mr. Arnold, we presume, does not claim to possess that amount of knowledge either of art or of science which would render him a prejudiced witness, and, being unprejudiced, he drew a terrible picture of the future of art, not only in this, but in all other countries, unless some very decided steps were taken. Time out of mind, according to Mr. Arnold, art and literature had divided the sweets and beauties of this world between them, but now, in these latter days, that terrible thing science—

“*Monstrum horrendum, informe, ingens, cui lumen ademptum*,” was about to bar their future progress, and invade and destroy the fair kingdoms of thought and work gained from the unknown by the labours of both. Hence the necessity of an alliance offensive and defensive against the common enemy; hence the artist and the man of letters were to band themselves together to stamp this new hydra from out the land.

It was not to be expected that such a view as this would be allowed to pass unchallenged by Mr. Huxley. He declined to regard science as an invading and aggressive power, eager to banish all other pursuits from the universe. Putting Mr. Matthew Arnold's view

in a more concrete form, he represented it as picturing science rising as a monster from out the troubled waters of the sea of modern thought, intent upon devouring the unprotected Andromeda of Art. For him Literature was Perseus equipped with the swift shoes of the ready writer, and the cap of invisibility of the editorial article, while the death-dealing quality of Medusa's head had a fitting representative in the sting of vituperation. Mr. Huxley's remarks dealt less with Andromeda than with Perseus, to whom he suggested the advisability of thinking twice before trying conclusions with the risen monster. He ended by showing how necessary Art and Science were to each other, how each was strong in the other's strength, and how they were never likely to be sundered, but were certain to twine round each other more closely, and to help each other more as time went on. Agreeing as we do altogether with Mr. Huxley, we think, however, that another view is worthy of consideration. For ourselves, although likening art to fair and chained Andromeda, we cannot admit that science is correctly represented in the form of the monster. Without further considering of whom or of what the monster may be typical, it seems to us perfectly certain that the Perseus of whom the Andromeda of Art stands so much in need is not Literature, but Science, because this Perseus alone can give the help and render the assistance which the maiden needs so sorely at the present moment.

Occasion has been before taken in these columns to point out how one of the greatest revivals of art in the history of the world was contemporaneous with the dawn of one of those sciences which must for ever lie at the base of much work in art: we refer to the science of anatomy; and when one looks round this year's Academy and compares the work based upon this branch of knowledge, the anatomy of form, with that connected with the other branch of knowledge which has to do with the anatomy of light and colour, one cannot but feel that the Andromeda of Art is being sacrificed indeed. Landscape painting has as close a connection with physical science as figure painting has with anatomy, and we cannot help thinking it is because physical science has not been sufficiently taught in our public schools, that our landscape painting is, if we are to judge by this year's pictures, not advancing, but almost retrograding. The man who finds anatomy too difficult for him and rushes into landscape soon discovers that there is something there which he has not learned, but which has to be learned ere he can achieve distinction; and like too many others he has to give up the battle ingloriously. Not for many years has there been such an absence of landscapes of the highest order as in the present Academy; and in order to show, on the one hand, how those artists who have some knowledge of the branches of science which bear upon their work in art have succeeded in filling their canvases with worthy representations of natural effects, and, on the other hand, how those who lacking this knowledge are only successful in producing misrepresentations and distortions of nature, we shall on a subsequent occasion give a series of notes upon those pictures which fall within the reach of our remarks. In some pictures the ignorance of one part of nature has been as great as if a portrait painter had painted a face in which the mouth was represented between the eyes and

the nose, or again as if he had painted feet instead of hands.

There is one instance so much in point that we may at once refer to it. One artist, who shall be nameless, has attempted to grace his picture by introducing into it a rainbow. Now if the rainbow had been part of the human form it would have been studied, there would have been books about it, and the artist would have made it as much his own as the student of physical science, since some artists study anatomy as closely as does the man of medicine, but, because the rainbow happens to lie outside that branch of scientific knowledge which is generally supposed to be the only branch to which artists need turn their attention, the painter thinks that he may treat it anyhow. Thus we have had rainbows with the colours—which in nature are absolutely definite in their order and arrangement—painted in reverse order; again, we have had a rainbow, which must always appear to form part of a circle, painted in perspective; but the rainbow fancier of this year has almost transcended the want of observation shown by his predecessors. Possibly ignorant of the fact that all primary rainbows are alike; that the order of colours, from red through orange, yellow, green, blue, indigo, to violet, is dominated by a most rigid law, to which there is, and can be, no exception; the artist has chosen to paint his rainbow with the violet in the middle. This seems to indicate either such looseness of observation or such contempt for nature—and the painter may take his choice between these two alternatives—that we doubt whether side by side with either there can exist that sympathy with nature which must lie at the root of all good work in art. We shall show on a subsequent occasion that this picture is only typical of a good deal of artistic work, which must in the nature of things act like a discord, and put the eye and the heart of the painter out of tune.

Those branches of science to which we have to make reference in these columns have to do of course with the forms and colours of clouds and sky and natural objects generally, and the laws of reflection, and if an artist will paint suns and moons, then with those elementary astronomical principles which have to deal with the appearances of these bodies, and which are not beyond the comprehension of a child in the Fourth Standard of a public elementary school. It is not therefore imposing too much upon an artist that he should know these things, and it is not too much to suppose that one who paints work on which he wishes to build his fortune or his reputation as the case may be, should wish to appeal to a more or less cultured audience. At present, perhaps, it is only a select few who notice and deplore this want of harmony with nature which marks the productions of so many of our artists; but the love of physical science among the great mass of mankind grows stronger and more strong, and the circle of those who can discriminate between fact and fancy as displayed in the works which grace the walls of our picture galleries is daily becoming a wider one. We would therefore utter a word of warning to the artist who allows blunders to creep into his picture because he thinks nobody will find them out. Somebody is sure to find them out.

The opportunities which artists in following their profession have of studying nature in very varied moods enable

them to see the actual phenomena, where *a priori* considerations leave a student who lacks such opportunities entirely in the dark. Several very interesting questions are raised by some of the pictures in this year's Academy, and the candid critic must acknowledge that many of them give much food for thought and suggestions for future inquiry and study on his own part.

#### THE TRANSIT INSTRUMENT

*A Treatise on the Transit Instrument as Applied to the Determination of Time; for the Use of Country Gentlemen.* By Latimer Clark, M.I.C.E., &c. (Published by the Author.)

IT is something new to have a book on the transit instrument for the use of country gentlemen. It is something still newer to find that book brought out by an eminent engineer. In fact we may regard the publication of such a book, under such conditions, as a sign of the times, and as an indication of the slow but sure way in which science, and even the methods of science, are interesting a gradually increasing number of our educated classes. Mr. Latimer Clark has done his work in a most admirable manner, and no country gentleman who wishes to know a little more than he does at present about the practical working of a most fascinating branch of science, could do better than invest, not only in the book, but in the very satisfactory and handy little instrument which Mr. Clark has been wise enough to produce side by side with it. This transit instrument to which we refer, and which can be obtained of Mr. Coppock of Bond Street, is an excellent one of its kind. It is cheap—costing only about 10*l.*—and it is simple. The many parts of the instrument which form necessary adjuncts to it when used in an observatory are of course suppressed, but nothing is wanting which is really of importance to that public which Mr. Latimer Clark wishes to educate in its use. The author is quite wise in the way he goes to work. We naturally have a description of the instrument, and reference to the way in which it can be most conveniently and satisfactorily employed, nor are those necessary adjustments omitted without which of course the simplest instrument would be of very little use. Full instructions are then given for putting it in position, and Mr. Clark's form of instrument has a cover, by means of which, when once placed in position, say, out on a stone pillar on a lawn with a good north and south line, it can be left out with very little chance of its taking any harm in all weathers. The actual taking of transits, both of the sun and stars, are then dealt with, and we should add here that the transit eyepiece is armed with a system of seven vertical wires, so that the means of several transits over the wires can be taken in the ordinary way. The only objection we have so far found to Mr. Latimer Clark's form, is that there are no means of adjustment for the verticality of the wires. We regard this as a point which should be looked to, in case our author should be fortunate enough to induce a great many people to employ this cheap and simple form.

The corrections for longitude and latitude are next given, and we are glad to see that the book deals with these matters in a way not only far from dry, but so as to introduce a considerable quantity of very useful astro-